WELDING PROCEDURE SPECIFICATION

WPS - 2007-8-A **REV. NO.:** 0 **DATE:** 7/12/2005 ****APPLICABILITY****

WELDING PROCESS: GTAW-A **and** **ASME:** X **AWS:** **OTHER:** DOE STD-3013-2003

SUPPORTING PQR: IC-PQR-02

JOINT: This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection etc.

Weld Joint Type: Square butt		**Class:**	Full penetration
See GWS 1-06 and WFP's for joint details		**Preparation:**	Machined - Clean with 100% ethyl alcohol
Root Opening: <0.005		**Backing:**	None (in glovebox)
Backgrind root: N/A		**Backing Mat.:**	N/A
Bkgrd Method: N/A		**GTAW Flux:**	**Backing Retainer:** N/A

FILLER METALS **Class:** N/A **and** N/A

A No: N/A **SFA Class:** N/A **and** N/A **F No:** N/A **and** N/A **Size:** N/A N/A N/A N/A

Insert: N/A **Insert Desc.:** N/A **Weld Metal Thickness Ranges:**

Flux: Type: N/A **Size:** N/A **AWS Root Pass:** 0 **thru** 0

Filler Metal Note: N/A Autogenous weld **AWS Balance:** 0.000 **thru** 0.000

ASME Root Pass: 0.05 **thru** 0.1

ASME Balance: 0.050 **thru** 0.100

BASE MATERIAL **P No.** 8 **Gr No.** All **to: P No.** 8 **Gr No.** All

Spec. SA-276 316L **Grade:** All **to: Spec.** SA-276 316L **Grade:** All

Qualified Pipe Dia. Range: ≥ **AWS:** 0 **ASME:** 4.5

Qualified Thickness Range: **AWS:** 0.000 **thru** 0.000 **ASME:** 0.050 **thru** 0.100

QUALIFIED POSITIONS: **AWS:** N/A **ASME:** All **Vert. Prog.:** V/Up-Dn

Preheat Min. Temp.:	70 **°F**	**GAS: Shielding:**		He		**or**			
Interpass Max. Temp.:	350 **°F**	**Gas Composition:**	100	/	/	**%**		/	/	**%**
Preheat Maintenance:	N/A **°F**	**Gas Flow Rate cfh:**	10	**to**	20			**to**		
PWHT: Time @ °F Temp.	N/A	**Backing Gas/Comp:**		He*				100	**%**	
Temp. Range:	N/A **°F**	**Backing Gas Flow cfh:**	0	**to**	0					
to	N/A **°F**	**Trailing Gas/Comp:**		He*				100	**%**	

APPROVAL: Signatures on file at ENG **DATE:** 7/12/2005

WELDING CHARACTERISTICS:

Current: DCEN **and** DCEN **Tungsten Type:** EWTH-2 **Transfer Mode:** N/A

Ranges: Amps 7 **to** 80 **Tungsten Dia.:** 0.035 **Pulsing Cycle:** 60 **to** 40

Volts **to** **Background Current:** 7

Fuel Gas: N/A **Flame:** N/A **Braze temp. °F** N/A **to** N/A

WELDING TECHNIQUE: **For fabrication specific requirements sucg as fittup, cleaning, grinding, PWHT and inspection criteria refer to Volume 2, Welding Fabrication**

Technique: Automatic fixed **Cleaning Method:** Abrasive cloth/ethel alcohol

Single Pass or Multi Pass: S **Stringer or Weave bead (S/W):** S **Oscillation:** N/A

GMAW Gun Angle °: 0 **to** 0 **Forehand or Backhand for GMAW (F/B):** N/A

GMAW/FCAW Tube to work distance: N/A

Maximum K/J Heat Input: N/A **Travel speed:** 6 **Gas Cup Size:** 0.150

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: N/A **Nil-Ductil Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: 1) Voltage is fixed with arc gap length of 0.055 - 0.075 in rotating welding head.
2) All welding is performed in a Helium atmosphere inside a glove-box.

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	GTAW-A	N/A	N/A	7 to 80	to	0 to 6	0 to 0	
2		N/A	N/A	0 to 0	to	to		
3		N/A	N/A	0 to 0	to	to		
4		N/A	N/A	0 to 0	to	to		
5								
6								

REM. * Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.

Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.